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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/764,009	01/17/2001	Masakazu Taguchi	0941.65134	3597

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EXAMINER

CHU, KIM KWOK

ART UNIT PAPER NUMBER

2653

DATE MAILED: 06/25/2004

3

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/764,009

Applicant(s)

TAGUCHI ET AL.

Examiner

Kim-Kwok CHU

Art Unit

2653

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

Drawings

1. Figures 1-4A and 4B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated.

See MPEP § 608.02(g). Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities:

(a) on page 3, under the section Brief Description of The Drawing, Applicant should indicate Figures 1-4A and 4B are prior art.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi (U.S. Patent 6,046,874) in view of Honma (U.S. Patent 6,111,835).

Takahashi teaches a data reproduction apparatus very similar to that of the instant invention. For example, Takahashi teaches the following:

- (a) as in claim 1, a Viterbi detection unit (Fig. 1);
- (b) as in claim 1, the Viterbi detection unit having a plurality of detectors 30, 32 (Fig. 1);
- (c) as in claim 1, the detector 30 providing a first partial response signal with a first constraint length from a first sequence of samples derived from a first readout signal (Fig. 1);
- (d) as in claim 1, a connection unit 34 selecting one of connection and disconnection of the plurality of detectors in

the Viterbi detection unit in response to a timing signal (Fig. 1);

(e) as in claim 1, the connection of the plurality of detectors is selected by the connection unit 34 (Figs. 1 and 2);

(f) as in claim 1, the Viterbi detection unit 32 provides a second partial response signal with a second constraint length from a second sequence of samples derived from a second readout signal (Fig. 1);

(g) as in claim 1, the second constraint length being different from the first constraint length (Fig. 1; different partial responses);

(h) as in claim 3, a first register PR4 in 94 storing a first expected value corresponding to the first partial response signal with the first constraint length (Fig. 2; column 8, lines 1-4);

(i) as in claim 3, a second register RPR4 in 94 storing a second expected value corresponding to the second partial response signal with the second constraint length (Fig. 2; column 8, lines 1-4);

(j) as in claim 4, one of the first expected value output from the first register and the second expected value output from the second register is selectively set to the Viterbi detection unit in accordance with the timing signal (Figs. 1

and 2; selecting/switching the Viterbi decoder is done by switching circuit 34 in the MPU 48);

(k) as in claim 5, the plurality of detectors include branch metric computation units, add-compare-select units, path metric memories, and pass memories, and wherein the connection unit selects one of connection and disconnection of each of the branch metric computation units, the add-compare-select units, the path metric memories in response to the timing signal (Figs. 1 and 2; column 6, lines 33-35; ACS circuit means in a branch metric calculator is an inherent feature of a Viterbi detector using a maximum likelihood estimation);

(l) as in claim 8, a control unit 48 that controls the connection unit by supplying the timing signal to the connection unit (Fig. 2).

However, Takahashi does not teach the following:

(a) as in claim 1, each of the Viterbi detector providing the first partial response signal;

(b) as in claim 2, the second constraint length is larger than the first constraint length;

(c) as in claim 5, the detectors include pass memories;

(d) as in claim 6, when the connection of the plurality of detectors is selected, the connection unit changes internal connections of the pass memories from internal connections of

the pass memories when the disconnection of the plurality of detectors is selected; and

(e) as in claim 7, when the connection of the plurality of detectors is selected, the connection unit changes the individual samples that are supplied to the plurality of detectors, from the individual samples supplied to the plurality of detectors when the disconnection of the plurality of detectors is selected.

Honma teaches the following:

(a) a dual mode Viterbi decoder (Fig. 1; column 4; lines 10-14);

(b) the second constraint length is larger than the first constraint length (column 9, lines 42-45);

(c) the decoder includes pass memories 30 (Figs. 1 and 2);

(d) when the connection of the plurality of detectors is selected, the connection unit changes internal connections of the pass memories from internal connections of the pass memories when the disconnection of the plurality of detectors is selected (Fig. 2; column 5, lines 38-65); and

(e) when the connection of the plurality of detectors is selected, the connection unit changes the individual samples that are supplied to the plurality of detectors, from the individual samples supplied to the plurality of detectors when

the disconnection of the plurality of detectors is selected (Fig. 2; column 5, lines 38-65).

Decoding a data sequence accessed from different recording zones requires a Viterbi decoder having a partial response which corresponds to that particular zone's channel characteristics. In order to reduce the number of Viterbi decoding means, it would have been obvious to one of ordinary skill in the art to replace Takahashi's partial response detection means 30 and 32 with Honma's dual mode Viterbi decoder, because the dual mode decoder does not require an additional decoding means equipped with a different partial response while decoding a data sequence with a different channel characteristic.

5. Method claims 9 and 10 are drawn to the method of using the corresponding apparatus claimed in claims 1 and 5. Therefore method claim 8 corresponds to apparatus claim 1 and is rejected for the same reasons of obviousness as used above.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sugawara et al. (6,501,610) is pertinent because Sugawara teaches a detecting circuit for read signal form magnetic recording system using partial response.

Fujimoto (6,148,043) is pertinent because Fujimoto teaches a Viterbi decoder having a branch metric calculating circuit.

Shimoda (6,122,120) is pertinent because Shimoda teaches a PRML decoder for processing different channel codes.

Shafiee (5,936,558) is pertinent because Shafiee teaches a signal detector for channels utilizing a code having time varying constrains.

Shiokawa et al. (5,781,590) is pertinent because Shiokawa teaches a partial response maximum likelihood signal processing apparatus.

Zook (5,737,142) is pertinent because Zook teaches a PR4 Viterbi sequence detector.

Kitaori (5,602,858) is pertinent because Kitaori teaches a digital signal decoding apparatus having a Viterbi decoder.

Adler et al. (4,609,907) is pertinent because Adler teaches a dual channel partial response system.

7. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks Washington, D.C.
20231 Or faxed to:

(703) 872-9306 (for formal communications intended for
entry. Or:

(703) 746-6909, (for informal or draft communications,
please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park
II, 2021 Crystal Drive, Arlington. VA., Sixth Floor
(Receptionist).

Any inquiry of a general nature or relating to the status
of this application should be directed to the Group
receptionist whose telephone number is (703) 305-4700.

Any inquiry concerning this communication or earlier
communications from the examiner should be directed to Kim CHU
whose telephone number is (703) 305-3032 between 9:30 am to
6:00 pm, Monday to Friday.

kc 6/16/04
Kim-Kwok CHU
Examiner AU2653
June 16, 2004

(703) 305-3032

William Korzuch
WILLIAM KORZUCH
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